

trigger. If, however, the sleeve J has turned to the firing position, this movement of the slide M pulls the trigger, as shown in Fig. 12, and releases the hammer, which flies backward, passes through the hole k, drives back the primer pin V and explodes the fulminate.

The charge may be fired also by direct impact of the propeller F against the target. Upon such impact the whole momentum of the torpedo is made effective to drive the body H and sleeve J with the front plate Q forwardly; while the propeller, its spindle, and the plug I are arrested by the encounter with the target or other obstacle. This results in the breakage of the fragile screw U, which is purposely made the weakest part. Thereupon a relative movement occurs between the body H carrying with it the sleeve J, on the one hand, and the plug I carrying with it the trigger L, on the other. If the parts are in the firing position this backward movement of the trigger is, because of its heel being engaged by the rear shoulder m of the slide M, accompanied by a tilting movement of the trigger which releases the hammer, and the latter is projected rearwardly through the hole k against the pin V, as shown in Fig. 13, and explodes the fulminate. If, however, the parts are in the safety position, the only effect of the impact is an idle backward movement of the plug without any release of the trigger, as shown in Fig. 14. Even if the trigger should be released, as possibly by the breaking of its spring, the consequent liberation of the hammer would merely project it backward against the imperforate portion of the rear wall j of the safety sleeve, and without other result.

The general operation will be apparent from the foregoing description. The parts of the exploder are put together and set to the safety position with the spindle G screwed fully back before inserting the body H in the chamber D. During the first portion of the run of the torpedo the parts remain in the safety position, so that an unexpected encounter with any obstacle could result in no explosion. After running a predetermined time, the screwing forward of the spindle G releases the latch R, and the safety sleeve turns to the firing position; if after this occurs the torpedo strikes either a direct or glancing blow against any obstacle affording sufficient resistance, the exploder is operated in one or the other of the ways already explained, thereby exploding the charge.

This invention is not limited to the precise details or combinations of apparatus described, although the described mechanism affords the preferred and most complete embodiment of the invention. The mechanism may be considerably simplified or otherwise

modified without departing from its essential features.

The propeller F and its screw-connection constitute a simple form of "timing mechanism" for insuring a predetermined delay before the safety device is displaced to its firing position. The firing levers constitute eccentric trip devices adapted to be displaced by a glancing blow against a sufficient obstruction; the levers may be replaced by other equivalent forms of trip devices.

What I claim is:—

1. A torpedo exploder having a hammer, a safety device movable into or out of the path of the hammer, and a timing device driven proportionately to the speed of the torpedo, for operating the safety device.

2. A torpedo exploder having a hammer, a safety device having a hole and movable to bring said hole out of or into the path of the hammer, and a timing device driven proportionately to the speed of the torpedo, for operating the safety device.

3. A torpedo exploder having a hammer, a safety device comprising an oscillating part having a hole and movable to bring said hole out of or into the path of the hammer, and a timing device driven proportionately to the speed of the torpedo, for operating the safety device.

4. A torpedo exploder having a hammer, a safety device adapted to be set originally to prevent the firing movement of said hammer, a latch for holding said safety device in the safety position, and a timing device for subsequently withdrawing said latch.

5. A torpedo exploder having a safety device movable from a safety to a firing position, a spring for so moving it, a latch for holding it in the safety position, and a timing device for withdrawing said latch comprising a propeller turned by the movement of the torpedo through the water.

6. A torpedo exploder having a safety device movable from a safety to a firing position; a spring for so moving it, a latch for holding it in the safety position, and a timing device for withdrawing said latch comprising a propeller turned by the movement of the torpedo through the water.

7. A torpedo exploder having a hammer, a trigger for restraining the hammer, a tripping device for operating the trigger, a safety device comprising means for connecting the tripping device with the trigger, said means in the safety position being displaced to disconnect said parts, and a timing device for operating the safety device to restore such connecting means and establish operative connection with the trigger.

8. A torpedo exploder having a hammer, a trigger for restraining the hammer, a safety device, and means for operating the trigger comprising a movable part carried by the safety device, the latter being mov-